Fabrication and Characterizations of Materials and Components for Intermediate Temperature Fuel Cells and Water Electrolysers

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Introduction

The worldwide development of fuel cells and electrolysers has so far almost exclusively addressed either the low temperature window (20-200 °C) or the high temperature window (600-1000 °C). This work concerns the development of key materials and components of a new generation of fuel cells and electrolysers for operation in the intermediate temperature range from 200 to 400 °C.
The intermediate temperature interval is of importance for the use of renewable fuels. Furthermore electrode kinetics is significantly enhanced compared to when operating at low temperature. Thus non-noble metal catalysts might be used.

One of the key materials in the fuel cell and electrolyser systems is the electrolyte. Proton conducting materials such as cesium hydrogen phosphates, zirconium hydrogen phosphates and tin pyrophosphates have been investigated by others and have shown interesting potential. [1-3]

Experimental

A new type of fuel cell and electrolyser suited for the temperature interval is in the design phase.
So far fuel cell and electrolysis tests have been performed for technical demonstration using phosphates as electrolytes.

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